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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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KATTEN MUCHIN ROSENMAN LLP
575 MADISON AVENUE
NEW YORK, NY 10022-2585

EXAMINER	
CHANG, EDITH M	

ART UNIT	PAPER NUMBER
2637	

DATE MAILED: 07/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/725,532	MIYAMOTO ET AL.	
	Examiner	Art Unit	
	Edith M. Chang	2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15,18-20,22-25 and 27-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,8,9,13-15,18-20,22-25 and 27-32* is/are rejected.

7)☒ Claim(s) *5,7 and 10-12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 February 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments/Remarks

1. Applicant's arguments, see pages 18-21, filed February 18, 2005, with respect to the rejection(s) of claim(s) 1, 2, 6, 13, 14, 29 and 30 under 35 U.S.C. 103 (a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Watanabe and Blodgett et al.

Drawings

2. The drawings were received on February 18, 2005. These drawings are accepted.

Claim Objections

3. Claims 22 and 28-32 are objected to because of the following informalities:

Claims 22 & 28, line 4: "a first amplitude" should be "the first amplitude"; line 6: "a second amplitude" should be "the second amplitude".

Claims 29 & 30, line 4: "each input signals" should be "an input signal", since there is no antecedent basis (input signals) for the "each".

Claim 31, line 4: "the pre-stage" should be "the pre-stage distortion extraction loop".

Claim 32, lines 3-4: "the pre-stage" should be "the pre-stage distortion extraction loop".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 6, 13-15, 18-20, 22-25 and 27-28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 6, lines 4-5: recites recombining said first and second subsignals to form a third signal, however, the third signal is not shown in the disclosure of the drawing (FIG.9);

lines 6: "canceling said first signal by the third signal", however, the first signal is cancelled by the signal formed by combining the first, second, and the third subsignals described in the teaching of FIG.9 and the specification;

Claims 13 & 14, lines 3-4: "cancels the input signal by recombining the split signals with the input signal" does not comply to the teaching and disclosure of the specification, in FIG.1A, FIG.2, FIG.6, FIG.7, FIG.9 and FIG.11 wherein the split signals are combined to cancel each other (A' and B') but not combined with the input signal to cancel the input signal.

Claims 15, 18-20, 22-25 and 27-28 are dependent on the rejected claims 13 and 14.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 6, 13-15, 18-20, 22-25, 27-28 and 31-32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6, the said first and second subsignals are recombined in lines 4-5 and combined in lines 7-8, it does not clearly indicate the recombining of the mutually in-phase second and second subsignals recited in lines 4-5; and said first and second subsignals being combined in mutually orthogonal phase recited in lines 7-8 of the claim 6, are the same or different, and their sequence.

lines 8-9: recite that said third subsignal is combined in a freely selected phase in the quadrant opposite the first and second subsignals. It is not clearly what is the sequence of this combining said third subsignal regarding to the recombining said first and second subsignals recited in lines 4-5 of this claim.

Claim 20, lines 8-9: "said first and second subsignals" does not clearly indicate that they are the "first and second subsignals" recited in claim 13 lines 5-6 or the "mutually orthogonal first and second subsignals" recited in claim 20 line 4.

Claim 27, lines 6-7: "said first and second subsignals" does not clearly indicate that they are the "first and second subsignals having the same pase" recited in claim 14

lines 5-6 or the "first, second and a third subsignals having the same phase" recited in claim 27 line 4.

Claim 31, lines 2-3: "said amplifier" lacks antecedent basis.

Claim 32, line 2: "the pre-stage amplifier" lacks antecedent basis.; line 3: "split signals" does not clearly indicate that the "split signals" splitted from which splitters, the in-phase splitter recited in claim 30 line 4, or the next-stage splitter recited in line 2 of claim 32.

Claims 15, 18-19, 22-25 and 28 are dependent on the rejected claims 13 and 14.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-4, 8-9, 13-15, 18-19, 23-25 and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Admitted Prior Art in view of Tatsuo Watanabe (JP 62-141824 A).

Regarding **claims 1-2, 13-14 & 29-30**, The FIG.15 of APA discloses a signal cancellation device 10 and its method comprising a splitter 11 to split the input signal IN into two split signals A' (the first signal) and B (the second signal), one of the two split signals B (the second signal) inputted to a cancellation adjuster 60, the output of the cancellation adjuster 60 inputted to the amplifier 14, then the other one of the two split

signal (the first signal) canceled by the output B' of the amplifier 14 (the third signal), however the APA does not specify the subsignals of the phase and amplitude adjusters in the cancellation adjuster.

In FIG.1, Tatsuo Watanabe teaches a signal to the branch circuit D_2 further branched into two subsignals (*first and second subsignals*), the first subsignal to the distortion output circuit 20, the second subsignal to the distortion output circuit 21, and an adding circuit 17 to combine the two subsignals to provide a summing signal to the summing circuit 18. The circuit 20 and 21, each has the attenuators (10, 11, 14 or 12, 13, 14a) to adjust the amplitude of the signal passing through. It is well known in the art that the branch circuit D_2 with the circuits 20 and 21 provides two subsignals which can be orthogonal by splitting or by combining.

At the time of the invention was made, it would have been obvious to one of the ordinary skill in the art to have the cancellation adjuster 60 of the APA replaced by the D_2, circuit 20 and circuit 21 taught by Tatsuo Watanabe in FIG.1 to have different operation point of the cancellation adjustment (page 5 line 18-page 6 line 1) for the purpose of getting a broad operation range to the amplitude and the phase distortion/adjustment (page 5 line 15-18).

The modified/combined cancellation loop circuit of the APA (FIG.15) with Tatsuo 's teaching cancels the first signal A' by the third signal B' generated from the amplifier 14 with the input from the output of the summer 18 (FIG.1 of Tatsuo).

Regarding **claims 3-4 & 8-9**, in FIG.1, Tatsuo Watanabe teaches one of the subsignals splitted into third and fourth subsignals by branch D_3 (or D_4), the fourth

subsignals delayed by delay element 7 (or 8), the other (third) subsignal adjusted by attenuators before combined with the fourth subsignal by element 9 (or 9a). The third and fourth subsignals are reverse phase and can be the same phase as well (page 4 lines 14-17), since wherein the delay element adjusts the phase of the signal passed through.

The branch D_3 (or D_4) is a splitter to split signal into inphase or opposite phase subsignals by adjusting the phase by delay element 7, and the element 9 (or 9a) is a antiphase combiner (the subtractor)

The reverse phased third and fourth signals can be achieved by splitting into opposite phase two subsignals or recombining in antiphase of two subsignals.

Regarding **claims 15** & **23**, in FIG.1, Tatsuo Watanabe teaches the circuit 20 with attenuators (10, 11, 14) is able to change the signal in both direction; increase (positive phase) or decrease (reverse phase).

Regarding **claims 18-19** & **24-25**, in FIG.1, Tatsuo Watanabe teaches the circuit 20 (or 21) comprising branch D_3 (or D_4) to split one of the subsignals splitted into third and fourth subsignals in reverse phase (in the same phase as well), the fourth subsignals delayed by delay element 7 or 8, since wherein the delay element adjusts the phase of the signal passing through (page 4 lines 14-17); the other (third) subsignal adjusted by attenuators before combined with the fourth subsignal by element 9 (or 9a) as the anti-phase combiner (the subtractor).

10. Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blodgett et al. (US 6,160,996) in view of Admitted Prior Art and Tatsuo Watanabe (JP 62-141824 A).

Regarding **claims 31 & 32**, the modified/combined cancellation loop circuit of the APA (FIG.15) with Tatsuo 's teaching does not specify a next-stage splitter and a pre-stage combiner, however, Blodget et al. discloses an adaptively controlling amplifier linearization device in FIG.2, wherein the amplifier linearization device 62 (column 4 lines 49-54, wherein the 62 is the feed-forward amplifier) comprises a cancellation circuit 76 in a pre-distortion loop (pre-stage) and a cancellation circuit 82 in the post-distortion loop (post-stage), but does not specify the detail structure of the cancellation circuit. At the of the invention was made, it would have been obvious to one of ordinary skill in the art to implement branch circuit D_2 distortion output circuits 20 and 21, and the combiner 17 taught by Tatsuo Watanabe in the cancellation circuit 76 (the combiner 17 in 76 is the *pre-stage combiner*) and 82 (the D_2 in 82 is the *next-stage splitter*) of FIG.2 of the Blodget et al.'s feed-forward amplifier 62, to have different operation point of the cancellation adjustment (page 5 line 18-page 6 line 1 of Tatsuo) for the purpose of getting a broad operation range to the amplitude and the phase distortion/adjustment (page 5 line 15-18 of Tatsuo).

Allowable Subject Matter

11. Claims 5, 7 and 10-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not teach or suggest, alone or in a combination, among other things, at least a signal cancellation device and its method as a whole, the combination of elements and features as claimed, which includes at least combining the a second splitted signal further splitted into first and second subsignals and a third subsignal having a freely selected phase in the opposite quadrant of the first and second subsignals; or the amplitude of the first subsignal and second the subsignal are adjusted by a first and a second adjustment process to reduce the outputsignal alternately in repetition respectively.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The reference of Donnell et al. (US 4,109,212) teaches the 90° coupler to divide the input signal (lines 3-4 Abstract, as the orthogonal splitter) and the 90° coupler to re-combined the signals (lines 8-10 Abstract, as the orthogonal combiner) of a complementary distortion circuit, and regarding the phase shift of the components to the complementary distortion circuit (column 4 lines 61-68, column 7 lines 45-50).

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M. Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay K. Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang
July 15, 2005

YOUNG T. TSE
PRIMARY EXAMINER